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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,470	05/19/2006	Ralf Lerner	60291.000041	8935
21967 7590 06/05/2007 HUNTON & WILLIAMS LLP INTELLECTUAL PROPERTY DEPARTMENT 1900 K STREET, N.W. SUITE 1200 WASHINGTON, DC 20006-1109			EXAMINER LOPEZ ESQUERRA, ANDRES	
			ART UNIT 2818	PAPER NUMBER
			MAIL DATE 06/05/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,470	Applicant(s) LERNER, RALF	
	Examiner Andrés López-Esquerria	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/16/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

2. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Content of Specification

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and

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descriptive, preferably from two to seven words may not contain more than 500 characters.

- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).
- (e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.
- (f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."
- (g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in

general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

- (h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).
- (l) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

3. The disclosure is objected to because of the following informalities: The specification is missing part (b) and the Titles of the parts (f) – (k) of the above list.

Appropriate correction is required.

4. Examiner would like to point out that no new matter can be added when amending the specifications so not to rise any 112 th issues.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsiao et al. US 6,515,826 (Hsiao) in view of So US 6,242,320 (So), and further in view of Hartmannsgruber, et al., "A Selective CMP Process for Stacked low-k'CVD Oxide Films", Microelectronic Engineering, Vol. 50, pg. 53-58, 2000 (Hartmannsgruber).

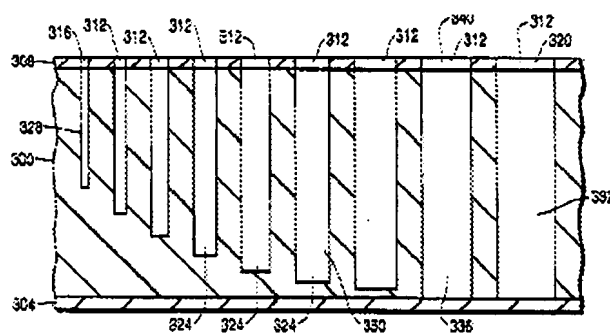


FIG. 15

7. As for claims 1 – 3, 5 – 6, 9 – 10, and 14 Hsiao discloses (Col 6 line 36 – Col 8 line 24) and shows in Fig 15 a device and method of manufacturing a semiconductor structure utilizing aspect ratio dependent etching comprising:

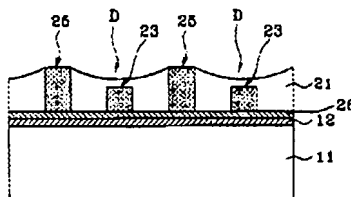
a. forming a test structure (Fig 15), defined by a systematic row of a plurality of trenches (324, 328, 336) having different widths and different depths in a defined manner, in an active wafer (300), said wafer receiving an active circuit (148, 178, 198, 222, 202) in a later stage;

i. wherein the deep trenches are formed in a etch process using an etch mask (308) having openings of different widths for the trenches of different widths (Claim 2 – 3);

b. wherein a targeted thickness of the active wafer (2) during the removal corresponds to a depth of a reference trench (350) of the trenches of the test structure, said reference trench (350) being flanked by shallower and deeper trenches, in particular by a neighboring shallower and a neighboring deeper trench (328,336);

8. Hsiao fails to teach the bonding of a carrier wafer after creating the trenches and the use of a polishing process on the backside of the active wafer made of silicon until exposing the reference trench.

FIG.2G



9. So discloses (Col 2 line 66 – Col 4 line 51) and shows in Fig. 2A – 2I a device and a method of manufacturing a semiconductor wafer comprising:

- c. forming a structure in an active wafer made of a silicon wafer (21) with a plurality of different trenches with different depths (22,24) including a reference trench (24);
- d. bonding the active wafer (21) with a side, in which the test structure is formed, onto the second wafer of the semiconductor wafer pair, in particular onto a carrier wafer (30) comprising silicon and oxide layers;
- e. performing a material removal process, in particular a polishing process, from the backside of the active wafer (21) until the reference trench (24) is exposed;
 - ii. wherein the polishing process is interrupted at least once (So discloses a two step polishing process (Col 4 lines 9 – 30)) (Claim 9 and 14).

So is evidence that ordinary workers in the art would find a reason, suggestion or motivation to use bond the active wafer made of silicon after creating the trenches to a carrier wafer and performing a polishing process in steps until exposing the reference trench.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Hsiao by using bond the active wafer made of silicon after creating the trenches to a carrier wafer and performing a polishing process in steps until exposing the reference trench for advantages such as having a uniform

semiconductor layer in the active wafer so as to have a better surface for the future device to be form as well as having better characteristics of the overall device (Col 2 lines 7 – 24).

10. Hsiao in view of So still fails to disclose the use of an optical device in the process (claim 1, 9 – 10 and 14)

11. Hartmannsgruber discloses (Page 53 – 54) a selective CMP process in a semiconductor substrate using the materials of silicon and silicon dioxide that uses a Tencor α -step profilometer (applicant's optical device) to measure the topography of the surface.

Hartmannsgruber is evidence that ordinary workers in the art would find a reason, suggestion or motivation to use a Tencor α -step profilometer (applicant's optical device) to measure the topography of the surface on a semiconductor substrate using the materials of silicon and silicon dioxide during a selective CMP process to terminate the polishing process.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Hsiao in view of So by using a Tencor α -step profilometer (applicant's optical device) to measure the topography of the surface on a semiconductor substrate using the materials of silicon and silicon dioxide during the selective CMP process to terminate the polishing process for advantages such as having a uniform semiconductor layer in the active wafer so as to have a better surface for the future device to be form as well as having better characteristics of the overall device (So Col 2 lines 7 – 24).

12. Furthermore, as for the limitation of claim 5 – 6 of the use of silicon and silicon dioxide, Hsiao discloses the claimed invention except for the use of silicon and silicon dioxide for the specific different wafers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use of silicon and silicon dioxide for the different wafers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

13. Also, as for claim 10 limitation of “for performing a material removal process, in particular a polishing process, from the backside of the active wafer (2) until the reference trench (7, in particular the bottom (7a) of the reference trench, is exposed;” is considered as a product by process limitation. “Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777F, 2d 659, 698, 227 USPQ 964, 966 (Fed. Cir. 1985); see also MPEP 2113. Finally, a recitation of “said first wafer for receiving an active circuit in a later stage” and “for monitoring the reduction in thickness” of the claimed invention does not result in a structural difference between the claimed invention and the prior art, thus claimed invention is only an art recognized suitability for an intended purpose, MPEP 2144.07.

14. As for claims 4 and 11, Hsiao shows in Fig 15 the trenches are open and un fill.

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15. As for claims 7 – 8 and 12, Hsiao discloses (Col 6 line 59 – Col 7 line 31) and shows in Fig. 15 the composition of the trenches to be a series of stripe-like shape trenches which are parallel in a continuously shallower or deeper series with increasing widths openings, wherein the trenches are more broader the more deeply they are formed.

16. As for claims 13 and 15 – 16, Hsiao discloses (Col 6 line 59 – Col 7 line 50) and shows in Fig. 15 that the reference trench (350) (applicant's predefined target thickness) is located in a central region of the structure with trenches on one side with openings of smaller width and smaller depth and trenches on the other side with openings of greater width and greater depth.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,156,621 and US 6,514,858.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrés López-Esquerro whose telephone number is (571) 272-9753. The examiner can normally be reached on M - Th 6:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272 - 1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrés López-Esquerro
Examiner
Art Unit 2818

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Andy Hays
Primary Examiner